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REMARKS

This is a full and timely response to the non-final Official Action mailed August 2, 2007. Reconsideration of the application in light of the above amendments and the following remarks is respectfully requested.

Claim Status:

Claims 39-60 were withdrawn from consideration under a previous Restriction Requirement. To expedite the prosecution of this application, withdrawn claims 39-60 are cancelled by the present paper without prejudice or disclaimer. Applicant reserves the right to file continuation or divisional applications as permitted by 37 C.F.R. to the withdrawn claims or to any other subject matter described in the present application.

Claims 8 and 25-28 were indicated by the Examiner as containing allowable subject matter. Applicant wishes to thank the Examiner for this indication of allowable subject matter. By the present paper various claims have been amended. No other claims are added or cancelled. Thus, claims 1-38 and 61-65 are currently pending for further action.

Objection to Claim:

In the outstanding Office Action, the Examiner objected to claim 13 due to a minor typographical error. This issue has been corrected by the present amendment. Therefore, following entry of the present amendment, the objection to claim 13 should be reconsidered and withdrawn.

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Prior Art:

(1) Claims 1-5, 7, 11-14, 61 and 62 were rejected as anticipated under 35 U.S.C. § 102(b) by U.S. Patent App. Pub. No. 2002/0076598 to Bostaph et al. ("Bostaph"). For at least the following reasons, this rejection is respectfully traversed.

A multi-cell fuel cell layer, comprising:  
a substrate;  
an array of fuel cells each having an anode, a cathode, and an electrolyte disposed on said substrate;  
conductors electrically coupled to said fuel cell array;  
*a fuel flow channel defined in a first, anode side of said substrate; and*  
*a cathode air flow channel defined in a second and opposite, cathode side of said substrate.*  
(Emphasis added).

Support for the amendment to claim 1 can be found in Applicant's originally filed specification at, for example, paragraph 0026.

In contrast, Bostaph does not teach or suggest a layer for a multi-cell fuel cell that includes a single substrate with "a fuel flow channel defined in a first, anode side of said substrate; and a cathode air flow channel defined in a second and opposite, cathode side of said substrate."

To the contrary, Bostaph teaches "a plurality of fuel cell assemblies 12." (Bostaph, paragraph 0018). The fuel cell assemblies are sandwiched between two substrates. (Bostaph, Fig. 1). One of the substrates, "[b]ase portion 14[,] has formed within a plurality of micro-fluidic channels as illustrated" including a fluid supply channel 32. (Bostaph, paragraph 0019). "Fluid supply channel 32 supplies a fuel-bearing fluid 34 to fuel cell 12." (*Id.*).

Then, in the other substrate (27), "a plurality of air flow-throughs 29 [are] positioned to overlay membrane electrode assembly 16." (Bostaph, paragraph 0024).

Thus, Bostaph does not appear to teach or suggest a layer for a multi-cell fuel cell that includes a single substrate with a fuel flow channel defined in a first, anode side of said

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substrate; and a cathode air flow channel defined in a second and opposite, cathode side of said substrate.” “A claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). See M.P.E.P. § 2131. For at least these reasons, the rejection based on Bostaph of claim 1 and its dependent claims should be reconsidered and withdrawn.

Claim 61 recites:

An electrochemical system, comprising:  
means for supporting an array of fuel cells comprising a substrate;  
means defined in a first side of said substrate for conveying cathode air across fuel cells of said array; and  
means defined in a second, opposite side of said substrate for conveying fuel across said fuel cells of said array.  
(Emphasis added).

Support for the amendment to claim 61 can be found in Applicant's originally filed specification at, for example, paragraph 0026.

In contrast, as demonstrated above, Bostaph does not appear to teach or suggest the claimed electromechanical system with a substrate and “means defined in a first side of said substrate for conveying cathode air across fuel cells of said array; and means defined in a second, opposite side of said substrate for conveying fuel across said fuel cells of said array.”

Again, “[a] claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). See M.P.E.P. § 2131. For at least these reasons, the rejection based on Bostaph of claim 61 and its dependent claims should be reconsidered and withdrawn.

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(2) Claim 6 was rejected under 35 U.S.C. § 103(a) over the combined teachings of Bostaph and U.S. Patent No. 5,773,160 to Wilkinson et al. ("Wilkinson"). This rejection is respectfully traversed for at least the same reasons given above with respect to the patentability of the corresponding independent claims.

(3) Claims 9, 10 and 65 were rejected under 35 U.S.C. § 103(a) over the combined teachings of Bostaph and JP 08-213043 to Takayanagi ("Takayanagi"). This rejection is respectfully traversed for at least the same reasons given above with respect to the patentability of the corresponding independent claims.

(4) Claim 15 was rejected under 35 U.S.C. § 103(a) over the teachings of Bostaph taken alone. This rejection is respectfully traversed for at least the same reasons given above with respect to the patentability of the corresponding independent claims.

(5) Claims 16, 32-34, 36, 63 and 64 were rejected under 35 U.S.C. § 103(a) over the combined teachings of Bostaph and U.S. Patent Application Publication No. 2003/0022051 to Haluzak ("Haluzak"). This rejection is respectfully traversed for at least the following reasons.

Claim 16 recites:

A fuel cell system, comprising:  
a plurality of fuel cell layers each including an array of fuel cells each having an anode, a cathode, an electrolyte and conductors disposed on a substrate, *a fuel flow channel defined in an anode side of said substrate, and a cathode air flow channel defined in an opposite cathode side of said substrate,*  
wherein said fuel cell layers are alternating stacked.  
(Emphasis added).

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Support for the amendment to claim 16 can be found in Applicant's originally filed specification at, for example, paragraph 0026.

In contrast, as demonstrated above, Bostaph does not appear to teach or suggest a fuel cell system in which a plurality of fuel cell layers are disposed on a substrate with "a fuel flow channel defined in an anode side of said substrate, and a cathode air flow channel defined in an opposite cathode side of said substrate." Moreover, as Applicant has previously explained on the record, Haluzak also fails to teach or suggest this subject matter.

As shown in Figs. 4 and 5, each layer of the Haluzak system includes a substrate (62) which may be, for example, a silicon wafer. (Haluzak, paragraph 0025). Fuel cells, including the anode (50), electrolyte (42) and cathode (48), are formed on the substrate (62). (Haluzak, paragraph 0023). Fuel chambers (52) are formed or defined in, and extend through, the substrate (62). (Haluzak, paragraph 0025). *However, there is no cathode air flow channel that is similarly defined in an opposite or cathode side of the substrate.*

To the contrary, as clearly shown in Figs. 4-6, the fuel cells (50, 42, 48) are formed on one side of the substrates (62). The substrates are then stacked and placed in a frame (80) so as to allow air chambers (54) to exist *between the substrates*. However, there is no cathode air flow channel *defined in an opposite, cathode side of the substrate* as claimed.

Under the analysis required by *Graham v. John Deere*, 383 U.S. 1 (1966) to support a rejection under § 103, the scope and content of the prior art must first be determined, followed by an assessment of the differences between the prior art and the claim at issue in view of the ordinary skill in the art. In the present case, the scope and content of the prior art, as evidenced by Bostaph and Haluzak, did not include the claimed fuel cell system in which a plurality of fuel cell layers are disposed on a substrate with "a fuel flow channel defined in an anode side of said substrate, and a cathode air flow channel defined in an opposite cathode

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side of said substrate.” Rather, this subject matter appears to be wholly outside the scope of the cited prior art.

This difference between the cited prior art and the claimed subject matter is significant because the cited prior art did not provide the benefits available in the claimed subject matter, such as improved sealing and thermal cycle stress reduction. (See Applicant’s specification, paragraph 0030). For at least these reasons, the combination of Bostaph and Haluzak will not support a rejection of claim 16 under 35 U.S.C. § 103(a) and *Graham*. Therefore, the rejection of claim 16 should be reconsidered and withdrawn.

(6) Claims 17-24 were rejected under 35 U.S.C. § 103(a) over the combined teachings of Bostaph, Haluzak and Takayanagi. This rejection is respectfully traversed for at least the same reasons given above with respect to the patentability of the corresponding independent claims.

(7) Claim 29 was rejected under 35 U.S.C. § 103(a) over the combined teachings of Bostaph, Haluzak and U.S. Patent No. 6,503,651 to Nguyen (“Nguyen”). This rejection is respectfully traversed for at least the same reasons given above with respect to the patentability of the corresponding independent claims.

Additionally, claim 29 recites “wherein said fuel flow channels or air flow channels comprise ports that can be opened or closed to selectively activate or deactivate each individual layer of said plurality of layers.” The Action cites to Nguyen in this regard. (Action of 8/2/07, p. 9).

Nguyen teaches a method “for operating such a fuel cell system includes supplying fuel to the fuel inlets from a common source of fuel and supplying an oxidant to the oxidant

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inlets from a common source of oxidant. The outlets of a given cell are selectively opened to purge fuel product and oxidant product from the given cell while the outlets of other cells are kept closed." (Nguyen, abstract). Thus, Nguyen does not teach or suggest the ports that selectively activate or deactivate individual fuel cell layers as claimed. Rather, Nguyen merely teaches that, while all cells are operating, they can be individually purged of byproducts.

Under the analysis required by *Graham v. John Deere*, 383 U.S. 1 (1966) to support a rejection under § 103, the scope and content of the prior art must first be determined, followed by an assessment of the differences between the prior art and the claim at issue in view of the ordinary skill in the art. In the present case, the scope and content of the prior art, as evidenced by Bostaph, Haluzak and Nguyen, did not include the claimed "fuel flow channels or air flow channels [that] comprise ports that can be opened or closed to selectively activate or deactivate each individual layer of said plurality of layers."

For at least these reasons, the cited prior art will not support a rejection of claim 29 under 35 U.S.C. § 103(a) and *Graham*. Therefore, the rejection of claim 29 should be reconsidered and withdrawn.

(8) Claims 30 and 31 were rejected under 35 U.S.C. § 103(a) over the combined teachings of Bostaph, Haluzak and Takayanagi. This rejection is respectfully traversed for at least the same reasons given above with respect to the patentability of the corresponding independent claims.

(9) Claim 35 was rejected under 35 U.S.C. § 103(a) over the teachings of Bostaph, Haluzak and U.S. Patent Application Pub. No. 20030235745 to Mook et al. ("Mook"). This

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rejection is respectfully traversed for at least the same reasons given above with respect to the patentability of the corresponding independent claims.

(10) Claims 37-38 were rejected under 35 U.S.C. § 103(a) over the combined teachings of Bostaph, Haluzak, Takayanagi and Nguyen. This rejection is respectfully traversed for at least the same reasons given above with respect to the patentability of the corresponding independent claims.

Conclusion:

In view of the following arguments, all claims are believed to be in condition for allowance over the prior art of record. Therefore, this response is believed to be a complete response to the Office Action. However, Applicants reserve the right to set forth further arguments supporting the patentability of their claims, including the separate patentability of the dependent claims not explicitly addressed herein, in future papers. Further, for any instances in which the Examiner took Official Notice in the Office Action, Applicants expressly do not acquiesce to the taking of Official Notice, and respectfully request that the Examiner provide an affidavit to support the Official Notice taken in the next Office Action, as required by 37 CFR 1.104(d)(2) and MPEP § 2144.03.



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If the Examiner has any comments or suggestions which could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the number listed below.

Respectfully submitted,

DATE: October 19, 2007



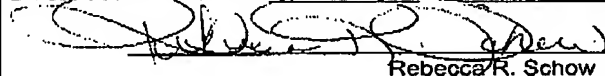
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